UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,081	04/01/2004	David B. Rozema	25795 US1	8619

83890 7590 01/21/2010

ROCHE MADISON INC.
465 Science Drive
Suite C
MADISON, WI 53711

EXAMINER	
DUNSTON, JENNIFER ANN	
ART UNIT	PAPER NUMBER
1636	
MAIL DATE	DELIVERY MODE
01/21/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/816,081	ROZEMA ET AL.	
	Examiner	Art Unit	
	Jennifer Dunston	1636	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 November 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19,22,23 and 27-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19,22,23 and 27-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/9/2009 has been entered.

Receipt is acknowledged of an amendment, filed 11/9/2009, in which claims 27 and 32 were amended to correct grammatical issues. Claims 19, 22, 23 and 27-32 are pending.

Election/Restrictions

Applicant elected Group II without traverse in the reply filed on 9/18/2006. Currently, claims 19, 22, 23 and 27-32 are under consideration.

Response to Arguments - Claim Objections

The objections of claims 27 and 32 have been withdrawn in view of Applicant's amendment to the claims in the reply filed 11/9/2009.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 19, 23 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolff (WO 00/75164 A1, cited in a prior action; see the entire reference) in view of Goldenberg et al (US Patent No. 5,629,184, cited in a prior action; see the entire reference) and Pfohl et al (US patent No. 4,880,497, cited in a prior action; see the entire reference). This rejection was made in the Office action mailed 8/13/2009 and is reiterated below.

Wolff exemplifies a method for delivering a polynucleotide to the cytoplasm of a cell, comprising (i) condensing the polynucleotide with a poly-L-lysine (PLL) polycation to form a binary complex; (ii) associating the binary complex with a reversibly inhibited membrane active polymer to form a ternary complex (recharging); and (iii) delivering the ternary complex to a cell, wherein the ternary complex is endocytosed by the cell (e.g., page 76, line 15 to page 78, line 15; page 106, line 19 to page 107, line 15). Wolff teaches the method where the "reversibly inhibited membrane active polymer" is a membrane active polyamine selected from the group consisting of melittin, KL_3, KL_3PLL to which a plurality of disubstituted maleic anhydride derivatives are reversibly linked via pH labile bonds (e.g., paragraph bridging pages 52-53; page

76, line 15 to page 78, line 15). Further, Wolff teaches that linkage of the disubstituted maleic anhydride derivatives to the membrane polyamine polymer inhibits liposome leakage activity (as measured by red blood cell lysis) of the membrane active polyamine and cleavage of the disubstituted maleic anhydride derivatives from the reversibly inhibited membrane active polymer restores liposome leakage activity of the membrane active polyamine (e.g., paragraph bridging pages 21-22; page 24, line 5 to page 25, line 4; paragraph bridging pages 52-53; page 103, line 25 to page 104, line 12). Thus, Wolff teaches the method where (a) a first amine-containing polymer is formed; (b) a second amine-containing polymer capable of causing liposomal leakage is formed; (c) the second amine-containing polymer is modified via covalent linkage of a plurality of disubstituted maleic anhydride derivatives, where the disubstituted maleic anhydride derivatives inhibit the membrane active polymer until the maleic anhydride derivatives are cleaved off the polymer in the acidic endosome; (d) the first amine-containing polymer is complexed with a polynucleotide to form a binary complex; (e) the binary complex is associated with the reversibly inhibited membrane active polymer to form a ternary complex; and (f) a cell is contacted with the ternary complex resulting in the delivery of the polynucleotide to the cell (see the discussion above and page 20, line 28 to page 22, line 4; page 38, lines 7-27). Wolff teaches that the polymers of the invention can be produced by step polymerization or chain polymerization (e.g., page 39, line 18 to page 42, line 9). For chain polymerization, Wolff teaches the use of monomers containing vinyl groups (e.g., page 41, lines 28-33). Wolff teaches the method where the membrane active polyamine disrupts an endocytic membrane after cleavage of the disubstituted maleic anhydride moiety thereby providing delivery of the polynucleotide to the cytoplasm of the cell (e.g., paragraph bridging pages 52-53; page 76, line

15 to page 78, line 15; page 106, line 19 to page 107, line 15). Wolff teaches the method where the disubstituted maleic anhydride derivatives are carboxydimethylmaleic anhydride (2-propionic-3-methylmaleic anhydride) (e.g., paragraph and bridging pages 52-53; page 64, lines 1-18; page 66, lines 22-27; page 77, line 22 to page 78, line -15). Wolff teaches the method where the disubstituted maleic anhydride derivatives are cleaved from the polyamine in an endosome (e.g., paragraph bridging pages 52-53; page 76, line 15 to page 78, line 15; page 106, line 19 to page 107, line 15).

Wolff does not teach the method where the first and second amine-containing polymers are amine-containing amphiphilic polyvinylether polymers.

Goldenberg et al teach the cytoplasmic delivery of polyanions, such as oligonucleotides, based on studies in which copolymers based on vinyl alcohol and vinyl amine (PVAVAMs) were used to deliver the oligonucleotides to the cells (e.g., paragraph bridging columns 2-3). Goldenberg et al teach that the PVAVAMs are prepared using hydrophobic and hydrophilic polymerizable vinylic monomers that have from 0.5-75 mole % vinyl amine content (e.g., column 3, lines 19-27). Although Goldenberg et al exemplify the use of vinyl alcohol/vinyl amine polymers (e.g., Example 2), Goldenberg et al teach that one skilled in the art would recognize variations in the method of preparation of the polymers, including the use of vinyl alkyl ethers, wherein the alkyl portion has 1 to 6 carbon atoms (e.g., column 4, lines 14-25). Further, Goldenberg et al teach that the copolymers may be modified by maleic anhydride (e.g., column 4, lines 55-63). Goldenberg et al teach that there have been extensive reports on the synthesis of the copolymers, including US Patent No. 4,880,497 (e.g., column 2, lines 43-51).

Pfohl et al teach the production of water-soluble copolymers containing copolymerized vinylamine units, where the copolymers are prepared by copolymerizing (a) from 95 to 10 mol% of N-vinylformamide and (b) from 5 to 90 mol % of an ethylenically unsaturated monomer such as C_1 to C_4 alkyl vinyl ethers, and hydrolyzing the formyl group to produce polyamine polymers with a molecular weight greater than 10000 Da (e.g., Abstract; column 1, line 58 to column 3, line 38; column 4; Examples 1-2).

Because Wolff teaches the use of amine-containing polymers for the delivery of a polynucleotide to a cell and suggests the use of polymers composed of vinyl monomers, and Goldenberg et al teach copolymers comprising an alkyl vinyl ether and vinyl amine monomers for the delivery of a polynucleotide to a cell, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the polyamine polymer of Wolff (e.g., poly-L-lysine) with vinyl ether/vinyl amine copolymer of Goldenberg et al in order to achieve the predictable result of providing a polycationic polyamine polymer for condensation of DNA in a binary complex and for providing a polymer that is modified to contain membrane active moieties and is reversibly inhibited by carboxydimethylmaleic anhydride to recharge the binary complex for delivery of the polynucleotide to a cell. Furthermore, it would have been obvious to one of ordinary skill in the art to use polymers each having a molecular weight greater than 10,000 Daltons, because Goldenberg et al teach that methods of producing the polymers were known in the art, and the prior art methods result in the production of polymers greater than 10,000 Daltons.

Claims 22 and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolff (WO 00/75164 A1, cited in a prior action; see the entire reference) in view of Goldenberg et al (US Patent No. 5,629,184, cited in a prior action; see the entire reference) and Pfohl et al (US patent No. 4,880,497, cited in a prior action; see the entire reference) as applied to claims 19, 23 and 27-29 above, and further in view of Wolff (WO 00/03694 A1, cited in a prior action; see the entire reference). This rejection was made in the Office action mailed 8/13/2009 and is reiterated below.

The combined teachings of Wolff (WO 00/75164 A1), Goldenberg et al, and Pfohl et al are described above and applied as before. Further, Wolff teaches that DNA/polycation complexes can be recharged with a polyanion and crosslinked (e.g., page 13, lines 15-17; page 36, lines 9-17). Wolff teaches that particle formation should be reversible to allow escape of DNA from the endosome, and conditions that cause the reverse of particle formation may be the pH (e.g., page 10, lines 22-29). Wolff teaches the use of pH-labile bonds to allow reversal under lower pH conditions of the endosome (e.g., page 19, lines 25-30; page 22, line 32 to page 23, line 25; page 37, lines 1-14). Wolff teaches that disulfide bonds are inherently labile and can be used to construct very pH-labile bonds (e.g., page 48, lines 23-26). Further, Wolff teaches that it is preferable to use DNA complexes of about 100 nm (e.g., page 8, lines 5-17). Moreover, Wolff teaches that PEG chains act as a steric stabilizer that prevents aggregation of final polymer by sterically hindering particle to particle electrostatic interactions (e.g., page 44, lines 9-14). Wolff teaches the covalent attachment of PEG to 2-propionic-3-methylmaleic anhydride (carboxydimethylmaleic anhydride, CDM) (e.g., page 66, lines 10-20), and the reaction of CDM-PEG with PLL (e.g., page 107, lines 26-29).

Wolff (WO 00/75164 A1), Goldenberg et al, and Pfohl et al do not specifically teach the method where the first amine-containing amphiphilic polyvinylether polymer is crosslinked to the reversibly inhibited membrane active polymer via a pH-labile bond to form a negatively charged, salt stable nanoparticle.

Wolff (WO 00/03694 A1) teaches the formation of condensed DNA with a polycation to form a binary complex, which is recharged with a polyanion (e.g., paragraph bridging pages 17-18). Wolff teaches that the binary complex of DNA and polycation can be recharged with a polyanion to provide the ternary complex with a net negative charge (e.g., paragraph bridging pages 17-18). Further, Wolff teaches that the interaction between the polycation and polyanion of the ternary complex may be via a covalent crosslink between cationic and anionic sites, including cleavable crosslinking systems, including those containing disulfide bonds (e.g., paragraph bridging pages 17-18). With regard to particle size of ternary complexes, Wolff teaches that a DNA/PLL binary complex recharged with succinic anhydride has a net negative charge and forms nanoparticles (e.g., page 18, lines 9-16; page 27, line 3 to page 28, line 8). When the cationic and anionic layers of the DNA particles were crosslinked, the stability of the nanoparticles was substantially improved (e.g., page 27, lines 9-11; Table 2). Furthermore, binary complexes of DNA and PLL recharged with PEG-SPLL displayed higher stability as compared to non-pegylated particles (e.g., page 28, lines 10-25; Table 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of delivering a polynucleotide to the cytoplasm of a cell of Wolff (WO 00/75164 A1), Goldenberg et al and Pfohl et al to include the cross-linking of the polycation of the binary complex with the polyanion used to recharge the binary complex and

form a ternary complex as taught by Wolff (WO 00/03694 A1) because Wolff (WO 00/75164 A1) teach it is within the ordinary skill in the art to use a recharging process to form a ternary complex and Wolff (WO 00/03694 A1) teach covalent linking of the polyanion used to recharge the binary complex containing the polycation. Furthermore, Wolf (WO 00/03694 A1) teaches the use of labile linkages in the crosslink, such as those containing a disulfide bond, and Wolff (WO 00/75164 A1) teaches very pH-labile bonds comprising a disulfide bond. Moreover, both Wolff references teach the addition of PEG to stabilize the complex, and Wolff (WO 00/03694 A1) teaches that pegylation stabilizes the particle while maintaining a small nanoparticle of about 100 nm, and Wolff (WO 00/75164 A1) teaches that particles of about that size are desirable.

One would have been motivated to make such a modification in order to receive the expected benefit of providing a more stable nanoparticle as taught by Wolff (WO 00/03694 A1). Based upon the teachings of the cited references, the high skill of one of ordinary skill in the art, and absent any evidence to the contrary, there would have been a reasonable expectation of success to result in the claimed invention.

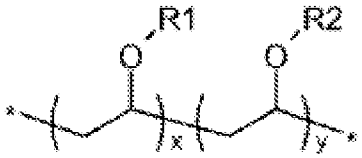
Response to Arguments - 35 USC § 103

With respect to the rejection of claims 19, 23 and 27-29 under 35 U.S.C. 103(a) as being unpatentable over Wolff (WO 00/75164 A1) in view of Goldenberg et al (US Patent No. 5,629,184) and Pfohl et al (US patent No. 4,880,497), Applicant's arguments filed 11/9/2009 have been fully considered but they are not persuasive.

First, the response notes that Goldenberg et al teach a polyvinylalcohol/polyvinylamine copolymer of the following structure (shown in column 3):

> Copolymers of the present invention are comprised of vinyl alcohol (VA), and vinylamine (VAM), of the general formula I,
>
> —(CH_2—HCOH—)x—(CH_2—HCNR1R2R3—)y—Az— I.
>
> where
>
> R1, R2 and R3 are independently hydrogen, lower alkyl or 2-hydroxyalkyl,or R1=R2=hydrogen, lower alkyl or 2-hydroxyalkyl and R3 is a lone pair electron
>
> A is the residual of a vinylic monomer
>
> x, y, and z are integers, representing the number of incorporated monomer and where x+y+z=100

The response notes that this particular structure of Goldenberg et al is distinct from the following amine-containing amphiphilic polyvinylether polymer:



where R1 contains an amine and R2 contains a hydrophobic group. Applicant asserts that the above formula is claimed and not taught by Goldenberg et al.

This argument is not found persuasive. First, the claims are not limited to the structure presented in Applicant's remarks. The claims encompass the use of any "first amine-containing amphiphilic polyvinylether polymer" and any "second amine-containing amphiphilic polyvinylether polymer capable of causing liposomal leakage." The claims are reasonably interpreted as encompassing any polyvinylether copolymer or homopolymer that further contains amine groups. The present specification states, "A polymer can be a homopolymer in which a

single monomer is used or can be copolymer in which two or more monomers are used" (page 11, lines 31-32). Thus, the references need not teach the formula recited in Applicant's remarks, because the claims are not limited to the use of structures of this formula. Second, the teachings of Goldenberg et al are not limited to the structure of formula I. Goldenberg et al teach that the PVAVAMs utilized by the disclosed methods are "prepared using hydrophobic and hydrophilic polymerizable vinylic monomers and have from 0.5-75 mole % vinyl amine content" (column 3, lines 19-22). While the compounds of formula I represent a preferred embodiment of Goldenberg et al, Goldenberg et al state, "One skilled in the art will recognize variations in the method of preparation of the present polymers" (column 4, lines 14-16). Goldenberg et al go on to further characterize the hydrophobic and hydrophilic polymerizable vinylic monomers that may be polymerized (column 4, lines 17-54). These monomers include vinyl alkyl ethers wherein the alkyl portion has 1 to 6 carbon atoms and N-vinyl formamide. Pfohl et al specifically teach the production of water-soluble copolymers containing copolymerized vinylamine units, where the copolymers are prepared by copolymerizing (a) from 95 to 10 mol% of N-vinylformamide and (b) from 5 to 90 mol % of an ethylenically unsaturated monomer such as C_1 to C_4 alkyl vinyl ethers, and hydrolyzing the formyl group to produce polyamine polymers with a molecular weight greater than 10,000 Da (e.g., Abstract; column 1, line 58 to column 3, line 38; column 4; Examples 1-2). The resulting polymer falls within the scope of the claimed "amine-containing amphiphilic polyvinylether polymer."

Second, the response asserts that Goldenberg et al teach the formation of polymers using vinyl alcohol monomers, vinyl amine monomers and an optional *third monomer A*, which must

also contain a vinyl or –C=C- group. Further, the response asserts that this contrasts with the claimed polymers, which are synthesized from vinylether monomers.

This argument is not found persuasive. Goldenberg et al teach the polymerization of hydrophobic and hydrophilic polymerizable vinylic monomers (e.g., column 3, lines 19-22). The polymerization reactions exemplified by Goldenberg et al and Pfohl et al are directed to the polymerization of *two monomers* (e.g., N-vinyl formamide and a hydrophobic vinyl monomer). The A in formula I of Goldenberg et al represents "the residual of a vinylic monomer" (column 3, line 48). Goldenberg et al define "residual of a vinyl monomer" to mean "the monomer unit left after polymerization" (column 3, lines 52-56). Contrary to Applicant's assertion there is no optional third monomer A taught by Goldenberg et al.

Third, the response notes that Goldenberg et al do teach effective polymers that contain a number of different monomers (column 4, lines 17-54), and that these monomers include vinyl ether monomers. The response asserts that the vinyl ether monomers are component A in the structure presented in column 3, lines 39-50. The response asserts that Goldenberg et al does not teach a polymer that does not contain vinyl alcohol and vinyl amine monomers or is not composed primarily of vinyl alcohol and vinyl amine monomers. The response asserts that the vinyl ether monomers are only one of a long list of monomers which Goldenberg et al teaches can be incorporated into polyvinyl alcohol/polyvinylamine polymers and does not teach any specific polymer or benefit of incorporating vinyl ether monomers.

These arguments are not found persuasive. First, contrary to Applicant's assertion, the vinyl ether monomers are not component A in the formula of Goldenberg et al. As discussed above, component A is a residual of a vinylic monomer. Second, Goldenberg et al teaches

polymers based upon vinyl alcohol and vinyl amine (PVAVAMs), where the polymers are prepared using hydrophobic and hydrophilic polymerizable vinylic monomers (e.g., column 3, lines 2-27). Suitable monomers taught by Goldenberg et al include vinyl alkyl ethers wherein the alkyl portion has 1 to 6 carbon atoms and N-vinyl formamide (column 4, lines 17-54). Pfohl et al specifically teach the production of water-soluble copolymers containing copolymerized vinylamine units, where the copolymers are prepared by copolymerizing (a) from 95 to 10 mol% of N-vinylformamide and (b) from 5 to 90 mol % of an ethylenically unsaturated monomer such as C_1 to C_4 alkyl vinyl ethers, and hydrolyzing the formyl group to produce polyamine polymers with a molecular weight greater than 10,000 Da (e.g., Abstract; column 1, line 58 to column 3, line 38; column 4; Examples 1-2). A suggestion or motivation to combine references is an appropriate method for determining obviousness, however it is just one of a number of valid rationales for doing so. The Court in KSR identified several exemplary rationales to support a conclusion of obviousness which are consistent with the proper "functional approach" to the determination of obviousness as laid down in *Graham. KSR*, 550 U.S. 398, 127 S. Ct. 1727, 82 USPQ2d at 1395-97. See MPEP § 2141 and § 2143. In the instant case, prior art elements have been combined according to known methods to yield predictable results. Wolf et al teach the process of delivering a polynucleotide to the cell, but does not teach the method where the first and second amine-containing polymers are amine-containing amphiphilic polyvinylether polymers. Goldenberg et al teach that amphiphilic polyvinylether copolymers are suitable for the delivery of polynucleotides to cells. Pfohl et al provide further evidence that it was within the skill of the art to polymerize alkyl vinyl ethers and N-vinylformamide, followed by removal of the formyl group. Furthermore, Applicant has not shown that this mere substitution of one

polymer for another does anything more than yield a predictable result. No evidence of secondary considerations of nonobviousness has been provided.

Fourth, the response asserts that Goldenberg et al teach away from the claimed invention, because Goldenberg et al teach that the primary component of the polymer is composed of vinyl alcohol monomers with only low levels of vinyl amine monomers (abstract, column 2, lines 41-51) and les than 50 mole percent, more preferably less than 10%, any other monomer. The response asserts that this is a teaching away, because one would understand that effective polymers are composed primarily of vinyl alcohol subunits.

This argument is not found persuasive. Goldenberg et al teach that the polymers contain from 0.5-75 mole percent vinyl amine content, preferably 4-20 mole % vinyl amine content, or most preferably 6-15% mole % vinyl amine content (e.g., column 3, lines 19-27). At column 2, lines 41-51, Goldenberg et al teach that the art contains extensive reports on the synthesis of copolymers, based on vinyl alcohol with varying levels of vinylamine. The prior art disclosure of varied levels of amine content does not constitute a teaching away from the claimed invention, because the disclosure does not criticize, discredit, or otherwise discourage the solution as claimed. Furthermore, the claims do not require a particular amount of amine to be present. Moreover, Wolff et al teach the use of polymers such as poly-L-lysine, which has high amine content. Thus, one of skill in the art would have recognized that effective polymers contain amine groups.

For these reasons, and the reasons made of record in the previous office actions, the rejection is maintained.

With respect to the rejection of claims 22 and 30-32 under 35 U.S.C. 103(a) as being unpatentable over Wolff (WO 00/75164 A1) in view of Goldenberg et al (US Patent No. 5,629,184) and Pfohl et al (US patent No. 4,880,497), and further in view of Wolff (WO 00/03694 A1, Applicant's arguments filed 11/9/2009 have been fully considered but they are not persuasive.

The response argues the combination of Wolff (WO 00/75164 A1) in view of Goldenberg et al (US Patent No. 5,629,184) and Pfohl et al (US patent No. 4,880,497) at pages 4-5. These arguments were addressed above and are not persuasive for the reasons set forth above.

For these reasons, and the reasons made of record in the previous office actions, the rejection is maintained.

Conclusion

No claims are allowed.

All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer Dunston whose telephone number is 571-272-2916. The examiner can normally be reached on M-F, 9 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Low can be reached at 571-272-0951. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer Dunston/
Examiner
Art Unit 1636